

### Abstract of the Disclosure

The cross talk in the arrayed waveguide grating of the invention can be suppressed. Optical waveguide part (10) comprised of a core and a cladding is formed on silicon substrate (11), and the core forms the following waveguide composition. That is, first slab waveguide (13) is connected to the exit side of a plurality of optical input waveguides (12), and a plurality of arrayed waveguides (14) with varying lengths are disposed in parallel and connected to the exit side of the first slab waveguide. Second slab waveguide (15) is connected to the exit sides of the arrayed waveguides (14), and a plurality of optical output waveguides (16) are connected to the exit side of the second slab waveguide. A plurality of multiplex-inputted light beams with varying wavelengths which are made incident onto the optical input waveguides (12) are separated by each wavelength and outputted. The core is formed by means of flame hydrolysis deposition, and the number of deposited layers of the core is set to 13 or more. By suppressing the standard deviation of the amount of fluctuation in the refractive index of the core comprising the plurality of arrayed waveguides to  $4.84 \times 10^{-6}$  or less, the standard deviation of the phase error distribution of the arrayed waveguides (14) is suppressed to 0.6rad or less to suppress the cross talk to 40dB or less.